

## REMARKS

Claims 1, 3-12, 14-22, and 29-38 are pending in this application. Claims 1, 3, 7, 8, 11, 12, 15, 16, 20, 21, 22, 29, 30, and 31 have been changed by this amendment. Claims 2, 13, 27, and 28 have been cancelled, and claims 33-38 have been added.

The pending claims are believed patentable over *Davies* (U.S. Patent No. 4,593,470) within the context of 35 U.S.C. § 102 and 35 U.S.C. § 103. Claims 1 and 12 have been amended to overcome the 35 USC § 102(b) rejection of the final Office Action in the parent case (U.S. Serial No. 08/092,974).

Claims 1 and 12 have been amended to emphasize that the mechanical linkage that supports the stylus of Applicant's claimed invention provides the stylus with at least five degrees of freedom. The stylus of the Applicant's invention can be both oriented and spatially moved in the at least five degrees of freedom.

*Davies* describes a three dimensional tablet and stylus for determining three-dimensional coordinates of points of an object that is traced with the stylus. A user moves the stylus to a point on the object and the three-dimensional spatial coordinates (x, y, z coordinates) of that point are input to a computer. The stylus is attached to an arm that provides three degrees of freedom so that the coordinates can be calculated using the arm segment lengths and the relative angles of the arm segments to each other, as described in col. 4, lines 28-30.

In contrast, Applicant recites in claims 1 and 12 a stylus and a mechanical linkage coupled to the stylus for providing at least five degrees of freedom to the stylus. These five degrees of freedom are rotation about a longitudinal axis of the stylus, revolution about a lateral axis of the stylus, turning about a vertical axis of the stylus, and spatial movement along at least two other axes relative to a fixed surface. These axes are shown in Figure 1 of Applicant's specification. For example, rotation about Axis 6 in Figure 1 indicates the rotation about the longitudinal axis of the stylus, Axes 4 and 5 indicate revolution and turning about the stylus' other axes, and axes 1, 2 and 3 provide spatial movement for the stylus. The rotation, revolution, and turning degrees of freedom provide information about the orientation (roll, pitch, yaw) of the stylus, and the spatial degrees of freedom provide information about the location (e.g. x, y, and z coordinates) of the stylus. Means for producing an interactive stylus locative signal provides information about the orientation, location, and movement of the stylus to a computer display apparatus.

*Davies* does not disclose or suggest Applicant's invention since *Davies* does not determine the orientation of a stylus. *Davies* determines the three-dimensional position (i.e., location) of the stylus only. This is because all that *Davies* desires to measure is the x, y, and z coordinates of

different points of an object traced by the stylus. Thus, *Davies* provides a stylus that has only three degrees of freedom. *Davies* also provides a stylus with four degrees of freedom, but the extra degree of freedom only "facilitates contacting surfaces which might otherwise be inaccessible" (col. 5, lines 21-24), i.e. only x, y, and z coordinates of the stylus are sensed. The orientation of the stylus in *Davies* is not measured, nor is there a reason to measure orientation, since only spatial coordinates are desired. Adding a fifth or sixth degree of freedom to *Davies* would not be obvious, since three or four degrees of freedom is adequate for reading spatial coordinates and there is no need for adding more degrees of freedom.

Applicant provides information about the orientation and the location of the stylus to a computer apparatus. The orientation includes three specific degrees of freedom, including rotation about the longitudinal axis of the stylus (axis 6 in Figure 1). *Davies* does not disclose or suggest providing at least five degrees of freedom, where three of the degrees of freedom include the orientation of the stylus. *Davies* makes no mention of providing rotation about the longitudinal axis of the stylus (allowing the stylus to spin like a screwdriver), since such rotation would be useless when sensing only spatial coordinates. Finally, *Davies* does not disclose or suggest providing information about both the orientation and the location of the stylus to a computer apparatus. Therefore, Applicant believes that claim 1 is patentable over *Davies*.

In addition, as recited in claims 1 and 12, Applicant provides information about the orientation, location, and movement of the stylus to the computer display apparatus to manipulate images displayed by the computer display apparatus in accordance with the orientation, location, and movement of the stylus. For example, a cursor or other object can be displayed and moved by the computer display apparatus in accordance with the stylus. Applicant's invention thus provides a versatile interface between a user handling the stylus and images displayed by the controlling computer apparatus. *Davies*, in contrast, discloses no such interface. The *Davies* device traces the three-dimensional points of an object so that an image of the object can be reproduced, i.e., a device for inputting coordinates. *Davies* does not provide images on a display that are displayed in accordance with the orientation, location, and movement of the stylus, i.e. for interfacing with a computer-controlled display. Applicant therefore believes that claims 1 and 12 are patentable over *Davies*. Claims 3-11, 14-22 and 29-34 are dependent from claims 1 or 12 and are therefore patentable over *Davies* for at least the same reasons as explained with reference to claims 1 and 12.

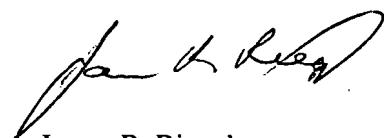
Dependent claims 11 and 22 are believed patentable over *Davies* in view of *Fisher* within the context of 35 U.S.C. §103. Claim 11 recites that the device of claim 1 includes feedback means for generating a force on the stylus in at least one of the five degrees of freedom in response to force signals correlated to information displayed on the computer display apparatus. Such feedback means are not disclosed or suggested by either *Davies* or *Fisher*. *Davies* does not disclose any force generation on his stylus, but only senses the three-dimensional position of the stylus. *Fisher* discloses virtual environment display systems, but mentions nothing about force feedback on the interface device held by the user. The glove interface of Fig. 9 of *Fisher* is an input device that provides a computer with the location of the user's hand and fingers. However,

no force is generated on the glove, i.e., the computer does not output force feedback signals to the glove. However, even if force feedback on the glove were disclosed, such as in the cited art U.S. patent 5,184,319 by *Kramer*, Applicant's invention would not be obvious. This is because the cited art only disclose force feedback on a floating device such as a glove or other device attached directly to a user. None of the art disclose or suggest force feedback on a stylus that is coupled to a mechanical linkage coupled to a fixed surface. Applicant therefore believes that claims 11 and 22 are patentable over *Davies*, *Fisher*, and the other cited art.

Applicant has added claims 33-37. Claim 33 is dependent from claim 1, and claim 34 is dependent from claim 11. Independent claim 35 recites an interactive device similar to that of claim 1 including a stylus, a mechanical arm linkage, a sensor for sensing the orientation and location of the stylus, and a transducer for providing a force along at least one of the plurality of degrees of freedom of the stylus. None of the cited references discloses or suggests generating force on a mechanical arm linkage and stylus. Claim 35, and dependent claims 36 and 37, are thus patentable over *Davies*, *Fisher*, and the other cited art for this and other reasons similar to those described above with reference to claims 1, 11, 12, and 22.

In view of the foregoing, Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance from the Examiner. Should the Examiner have any questions concerning this matter, he is respectfully requested to call the undersigned at the number set out below.

Respectfully submitted,



James R. Riegel  
Reg. 36,651

Palo Alto, California  
415-493-6400